2-Methyl-2-pentenal, a Compound in Onion Vapours

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When onion (*Allium cepa*) was homogenized with water and air or nitrogen gas was sucked through the homogenate with the aid of a vacuum pump and the vapours led through a dilute solution of 2,4-dinitrophenylhydrazine (DNPH), four carbonyl compounds could be separated from the crude DNPHone mixture on a cellulose powder column. In addition to acetaldehyde and propionaldehyde DNPHones, two unknown DNPHones of higher aldehydes were separated. The major unknown DNPHone could be characterized by elementary analysis, ozonization (formation of pyruvic acid), m.p. and mixed m.p. with the synthetic compound, IR and UV spectra and paper chromatography as 2-methyl-2-pentenal ($CH_3 \cdot CH_2 \cdot CH = C(CH_3) \cdot CHO$).

In order to elucidate the origin of the 2-methyl-2-pentenal, the enzymes in an onion were destroyed with trichloroacetic acid (TCA) and the volatile carbonyls distilled with steam into an ice-cold DNPH solution. The DNPHones formed were separated on a cellulose powder column. The other aldehydes were present as usual but at most only traces of 2-methyl-2-pentenal. In another experiment the onion was homogenized with water and the resulting pulpy mass was left to stand for an hour before adding TCA. After steam distillation the DNPHones formed were fractionated on a cellulose powder column. 2-Methyl-2-pentenal DNPHone was now found in normal amount. It seems that this carbonyl is formed enzymatically in crushed onion. Because it was also formed in an oxygen-free solution, oxygen may not be needed in the reaction.

The minor unknown has not yet been characterized chemically. The amount of this compound isolated is so minute that we have not been able to crystallize. it. The UV spectrum, however, is similar to that of a DNPHone of a saturated aldehyde. On the paper chromatogram, it migrates like authentic hexanal DNPHone.

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